CRW ENGINEERING GROUP, LLC

December 6, 2019

Native Village of Kivalina
PO Box 50051
Kivalina, Alaska 99750

Attn: Millie Hawley, Tribal Administrator

Re: Proposal – Kivalina Sea Level Rise Inundation Analysis
Kivalina, Alaska
Contract No. NVK 2018-IDIQ-CRW

Dear Millie,

We are pleased to submit this fee proposal for flood modeling services. The primary purpose of this study is to estimate flood levels in Kivalina as a results of climate change predictions and sea level rise. Pending the results of this study, a decision will be made as to whether or not additional analysis may be warranted. That decision will be based on the predicted flood heights and the feasibility of protecting impacted infrastructure.

Scope of Services

CRW proposes to perform the following scope of services.

Task 1 – Project Management / Coordination

This task will include management of the different project efforts and coordination with the Native Village of Kivalina (NVK) and the Denali Commission (DC).

Task 2 – Data Collection /Review

Existing information on the physical conditions in Kivalina will be collected and analyzed. This task will also include an assessment of the data required to complete a hydrodynamic model of the area and will identify the sea level rise scenarios to be analyzed in Task 4.

Task 3 – Field Investigations

There's a fair amount of survey data for Kivalina, but the information is based on different vertical and horizontal data. This task will include a land survey to coordinate the different horizontal and vertical control points. It will also include the measurement of finish floor elevations for critical infrastructure including the clinic, power plant, fuel tank farm, water treatment plant, store, city and tribal office, church, etc. The data will be compiled in a single database for flood modeling. The assumed duration of the land surveying effort is 5-days including travel. No bathymetry data will be collected as a part of this effort, but the basis of control for future data collection will be established.

Task 4 –Flood Modeling

This task will include development of a model from the information collected in Task 2 and the survey data compiled in Task 3. Sea level rise will be estimated using recently developed guidance developed by Washington State (https://cig.uw.edu/resources/special-reports/sea-level-rise-in-

washington-state-a-2018-assessment/). Though the guidance was developed specifically for Washington State, the same overall approach will be used and calculations suitably modified to estimate conditions at Kivalina. The deliverable from this task will be map of expected future inundation based upon existing US Army Corps of Engineers and USGS hydrodynamic modeling with a sea level rise overlay. A brief (one-page) summary of the results of the analysis will accompany the map.

Deliverables

The following deliverables will be provided as a part of the work.

- Base map of the island compiled from existing and new survey data – also to be used in the Master Plan
- Brief summary of the results from the sea level rise analysis
- An inundation map showing predicted flood heights in the community
- List of data requirements to perform a detailed hydrodynamic model as well as recommendations for the collection of that data (required coverage, density and data quality).

Schedule

We propose to complete the above described scope of services in accordance with the following schedule. The goal is to complete the modeling in time to include the results in the Master Plan.

- Issuance of a Delivery Order — December 23, 2019
- Data Collection / Review — December 30, 2019
- Land Surveying — January 31, 2020
- Flood Modeling — February 17, 2020

Fee

CRW proposed to complete the above described services on a time and expense basis in accordance with the terms and conditions of the IDIQ contract between NVK and the CRW. The estimated cost to complete the services is $50,683. This cost will not be exceed without prior written authorization from the NVK**.** A breakdown of the cost and summary of assumptions is shown on the attached spreadsheet.

Please call or email me with any questions. We appreciate the opportunity to submit this proposal and look forward to the project.

Sincerely,
CRW Engineering Group, LLC

Andrea D. Meeks

Andrea Meeks, PE
Project Manager/Principal Engineer

Attachments: Fee Estimate Spreadsheet (1 page)

cc: Monetta Adams, Denali Commission Relocation Coordinator
Jocelyn Fenton, Denali Commission Program Manager

Fee Estimate
Sea Level Rise Inundation Analysis
Kivalina Alaska
December 2019

	Principal/Project Manager	Principal/Land Surveyor	Staff Engineer II / Land Surveyor	Technician III	Clerical	Cost $					SUBCONSULTANT BREAK DOWN
	$185	$185	$125	$120	$75	Total Labor	Sub-Consultant Costs	Expenses	Line Item Totals	**Subtask Total**	
Task											Herrera
1.0 Project Management / Coordination											
1.1 Project Management	8				2	$1,630			$1,630		
1.2 Coordination with NVK and the DC	8					$1,480		$50	$1,535		
										$3,165	
2.0 Data Collection / Review											
2.1 Collection / Review of Existing Information							$3,440		$3,784		$3,440
										$3,784	
3.0 Field Investigation											
3.1 Land Survey / Datum Coordination											
Research and coordination	1	2	2			$805		$25	$833		
Equipment Mob & Demob via cargo		2	4		2	$1,020		$1,250	$2,395		
Travel		16	16	2		$5,200		$3,850	$9,435		
Field survey (Datum and FF Elevations)		30	30			$9,300		$1,250	$10,675		
Data reduction / combining multiple data sets		8	16			$3,480		$50	$3,535		
Preparation of CADD Model / basemap		4	16			$2,740		$100	$2,850		
										$29,723	
4.0 Initial Flood Modeling											
4.1 Model Development	1					$185	$2,130		$2,528		$2,130
4.2 Sea Level Rise Analysis	2					$370	$5,740		$6,684		$5,740
4.3 Letter Report and Inundation Map	4					$740	$3,690		$4,799		$3,690
										$14,011	
TASK TOTAL:	**24**	**62**	**84**	**2**	**4**	**$26,950**	**$15,000**	**$6,575**	**$50,683**	**$50,683**	**$15,000**

Assumptions:

1) The duration of the land surveying effort will be 5 days including travel.
2) Lodging will be available for $100/ night per person
3) A local 4-wheeler or snow machine with trailer/sled will be available to rent for $150/day

Subconsultant Legend:
Herrera - Herrera Environmental